

METHOD FOR REPLACING A DAMAGED TBC CERAMIC LAYER

ABSTRACT OF THE DISCLOSURE

The present invention is a method for repairing a TBC ceramic top coat in local regions that have experienced a mechanical or thermally-induced spallation event leaving the underlying bond coat intact. A novel combination of groove design (i.e. spacing, pattern and depth) and laser-surface incident angles fabricated into the remaining bond coat is used to achieve spallation resistance equal to or greater than baseline after applying and maintaining a TBC ceramic patch to the localized areas of spallation. The method is particularly useful, but not limited to, repair of coating systems comprised of physical vapor deposited (PVD) ceramic top coats. In a preferred embodiment, the method of the present invention comprises (1) cleaning the exposed spalled region, (2) treating a limited portion of the bond coat by a grooving process with two linear arrays of equally spaced grooves intersecting at a preselected angle so as to texture the surface, and (3) depositing a ceramic material on the surface of the spalled / textured portion of the bond layer. The grooving process is accomplished with a high energy beam.